CLAIMS

1. A method for preparing a population of cells comprising stem cells with a high amount of immature primitive progenitors, the method comprising collecting stem cells and introducing into the cells a DNA fragment comprising the sequence of CXCR4.
2. A method according to claim 1, wherein the population of cells exhibits improved CXCR4 signaling in response to low concentration of SDF-1.
3. A method according to claim 1, wherein the population of cells exhibits improved CXCR4 signaling in response to high concentration of SDF-1.
4. The method according to claim 1, wherein the stem cells are hematopoietic stem cells.
5. The method according to claim 4, wherein the hematopoietic stem cells are $CD34^+$ enriched.
6. The method according to claim 1, wherein the immature primitive progenitors are of the $CD34^+/CD38^{-/low}$ lineage.
7. The method according to claim 1, wherein collecting the stem cells is effected after inducing stem cell mobilization procedure; and/or comprises a surgical procedure.
8. The method according to claim 1, further comprising isolating by FACS stem cells having CXCR4 levels above a predetermined threshold.
9. The method according to claim 1, wherein the stem cells are capable of differentiating towards the myeloid and erythroid lineages.
10. The method according to claim 6, wherein the amount of immature primitive progenitors of the $CD34^+/CD38^{-/low}$ lineage are about 1-5% of the population.

11. The method according to claim 6, wherein the immature primitive progenitors of the $CD34^+/CD38^{-/low}$ lineage are in an amount equal to or higher than about 3% of the population.
12. The method according to claim 2, wherein the low concentration of SDF-1 is equal to or lower than about 50 ng/ml.
13. The method according to claims 2 or 12, wherein improved signaling is manifested as the enhancement of cell migration mediated by low concentrations of SDF-1.
14. The method according to claims 2 or 12, wherein improved signaling is manifested as the enhancement of cell proliferation mediated by low concentrations of SDF-1.
15. The method according to claim 3, wherein the high concentration of SDF-1 is equal to or higher than about 1 microgram/ml.
16. The method according to claims 3 or 15, wherein improved signaling signaling is manifested by a reduction in desensitization by SDF-1.
17. A population comprising stem cells expressing a high amount of immature primitive progenitors, exhibiting improved CXCR4 signaling capability in response to low and/or high concentrations of SDF-1, prepared by introducing into the stem cells a DNA fragment comprising the sequence of CXCR4..
18. The population of stem cells according to claim 17, wherein the stem cells are hematopoietic stem cells.
19. The population of cells according to claim 17 or 18, being capable of differentiating towards the myeloid and erythroid lineages.
20. The population of cells according to claim 19, wherein the hematopoietic stem cells are $CD34^+$ hematopoietic stem cells.
21. The population of cells according to claim 17, wherein the immature primitive progenitors are of the $CD34^+/CD38^{-/low}$ lineage.
22. The population of cells according to claim 21, wherein high amount of $CD34+/CD38^{-/low}$ is about 1-5% of the population.
23. The population of cells according to claim 21, wherein the high amount of $CD34+/CD^{38-/low}$ is about and above 3% of the population.

24. The population of cells according to claim 17, wherein the low concentration of SDF-1 is about and below 50ng/ml.

25. The population of cells according to claim 17, wherein the high concentration of SDF-1 is equal to or higher than about 1 microgram/ml.

26. Use of a population of cells according to anyone of claims 17-25 in the manufacture of a medicament for increasing homing of stem cells to a target tissue in a subject in need.

27. Use of a population of cells according to anyone of claims 17-25 in the manufacture of a medicament for increasing repopulation of a target tissue in a subject in need.

28. The use of a population of cells according to claims 26 or 27, wherein said target tissue is selected from the group consisting of bone marrow, blood vessel, heart, lung, liver, pancreas, kidney, nervous system, skin, bone and skeletal muscle.

29. Use of a population of cells according to claims 26 or 27, to facilitate transplantation.

30. Use of population of cells according to claim 29, wherein transplantation follows chemotherapy protocols.

31. Use of population of cells according to claim 29, wherein transplantation is autologous.

32. Use of population of cells according to claim 31, wherein the transplantation involves mobilization of autologous cells.

33. Use of population of cells according to claim 29, wherein transplantation is heterologous.

34. Use of population of cells according to claim 29, wherein the transplantation is carried with mobilized stem cells.

35. A method of treating a disorder in a subject requiring cell or tissue replacement, the method comprising providing to a subject in need thereof a therapeutically effective amount of a population of cells according to anyone of claims 17 to 25.

36. A method of preparing a population of cells comprising stem cells exhibiting CXCR4 with intact 6H8 epitope, the method comprising

collecting stem cells and introducing to the cells a DNA fragment comprising the sequence of CXCR4.

37. A population of cells comprising stem cells comprising intact CXCR4 6H8 epitope prepared by introducing a DNA fragment comprising the sequence of CXCR4.

38. Use of a population of cells according to claim 37, in the manufacture of a medicament for transplantation in a subject in need.

39. A method of treating a disorder requiring cell or tissue replacement, the method comprising providing to a subject in need thereof a therapeutically effective amount of a population of cells according to claim 37.

40. A pharmaceutical composition comprising a population of stem cells comprising stem cells exhibiting intact CXCR4 6H8 epitope prepared by introducing to the cells a DNA fragment comprising the sequence of CXCR4.